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EXAMINER

LEE, RIPA

ART UNIT	PAPER NUMBER
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1713

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 11

Application Number: 09/923,983
Filing Date: August 07, 2001
Appellant(s): LUO ET AL.

Arthur M. Reginelli
For Appellant

MAILED
DEC 02 2003
GROUP 1700

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 22, 2003.

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(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1, 2, 4, and 5.

Claims 21 and 22 are currently objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.[†]

[†] Status of claims 21 and 22 have changed in view of Appellant's calculations showing error in Examiner's rejection (see pages 10 and 11).

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1, 6, and 12 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

3,950,160	Kline	01-1976
6,117,956	Luo	09-2000

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(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,935,160 to Kline in view of U.S. Patent No. 6,117,956 to Luo.

Kline discloses use of dialkylaminomethyl phenols for preventing oxidative degradation of stereoregular diene polymers without concomitant discoloration (claim 1). Specific examples of the antioxidant include 2,6-di-*t*-butyl-4-dimethylaminomethylphenol and 2,6-di-*t*-butyl-4-piperidinomethylphenol (col. 2, lines 17 and 21). A practical amount of 1 part by weight of the phenolic compound per 100 parts of polymer is used (see Examples). The inventors state that not all polymers will benefit by the practice of the present invention (*i.e.*, polybutadiene prepared with a lithium catalyst), but only those containing the residue of transition metal catalyst will benefit (col. 3, lines 39-42). Various examples of polymer are described, but the reference does not suggest use of the inventive phenolic compounds with syndiotactic 1,2-polybutadiene.

Syndiotactic 1,2-polybutadiene, as disclosed in Luo, is prepared in the presence of a chromium catalyst. Although no specific steps regarding treatment of catalyst residue is mentioned, there is no reason to expect the resulting polymer to be completely devoid of catalyst residue. In fact, such a problem is well appreciated by those having skill in the art. Therefore, one having skill in the art, having read both references, would have found it obvious to use the compounds taught by Kline to prevent oxidative degradation arising from transition metal residue in syndiotactic 1,2-polybutadiene. Based on the teachings in the prior art, and absent any

teaching discouraging the skilled artisan from doing so, one would have expected this practice to work successfully.

(11) Response to Argument

(A) Appellants contend that a *prima facie* case of obviousness has not been established, and they present new comments A.2, A.3, and A.4 to support their position.

The key requirement in establishing a *prima facie* case of obviousness is that there must be some suggestion or motivation to combine teachings. In this regard, Appellants submit that Kline seems to teach away from the claimed invention. The argument hinges on the notion that not all compounds disclosed in the patent are effective as antioxidants and that the preferred, *tris*(dimethylaminomethyl)phenol, is ineffective as antioxidant.

Kline teaches use of dialkylaminomethyl phenols as catalyst deactivators for stereoregular diene polymers. The inventor attests, "those skilled in the art are constantly searching for deactivators which prevent metallic catalyst residues from causing severe oxidative degradation (col. 1, lines 24-25)." It can be gleaned from the text that stabilizing the diene polymer with dimethylaminomethyl phenols combats the degradation due to metal residues. Kline teaches that not all polymers will benefit by the practice of the invention (*i.e.*, polybutadiene prepared with a lithium catalyst), but those containing residue of transition metal catalyst will benefit.

The syndiotactic 1,2-polybutadiene of Luo is a stereoregular diene polymer prepared with a transition metal catalyst, and therefore, it is prone to metal residue contamination upon completion of polymerization. Trace amounts would also lead to oxidative degradation of the

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polymer if it not treated appropriately. Hence, the motivation to use Kline's compounds to stabilize the syndiotactic 1,2-polybutadiene against oxidative degradation due to metal residue flows naturally from the combined teachings, and it is a compelling one. As such, it is maintained that the skilled artisan would have found it obvious to use Kline's compounds in Luo's syndiotactic 1,2-polybutadiene.

Appellant's support for their conclusion that Kline teaches away from the claimed invention remains elusive. A reference is said to teach away when the skilled artisan would be discouraged from following the path set out in the reference.¹ It is not clear, then, how Kline discourages the skilled artisan from using his own compounds. If Kline does teach away from a particular concept, it is not using dialkylaminomethyl phenols for anionically polymerized polybutadiene, which uses lithium catalyst.

Appellants, however, attack the obviousness rejection by alleging that the one has made the erroneous interpretation that all polymers containing transition metal catalyst residues will benefit. Clearly, this is not the case. It would be erroneous to assume that catalyst deactivators of Kline would be suitable for polyethylene prepared with a Ti-based Ziegler Natta catalyst because polyethylene is markedly different from polydiene polymer. The rejection of record does not attempt such tenuous associations. Instead, the case has been made for use of Kline's compounds in syndiotactic 1,2-polybutadiene. This conclusion is valid, and it is logical because Kline teaches that his compounds are useful in stereoregular diene polymers.²

¹ *Tec Air, Inc. v. Denso Manufacturing Michigan* 192 F.3d 1353, 1360, 52 USPQ 129 (Fed. Cir. 1999).

² Examples: *cis-trans*-1,4-polybutadiene, *cis*-1,4-polyisoprene, 1,2-polyisoprene, and 3,4-polyisoprene (see Kline, col. 3, lines 3, 4, and 11).

Appellants submit that a fundamental difference between the role of catalyst deactivator and antioxidant has not been recognized. In this connection, they point to Kline's teaching that many species in the broad genus of DAAMP compounds are poor antioxidants. They also note that preferred results are achieved when the dialkylaminomethylphenol contains two or three dialkylaminomethyl groups and most preferably when both occupy the *ortho* position. Appellants also allege that, in the rejection, catalyst deactivators were equated with antioxidants.

The difference between catalyst deactivator and antioxidant is fully appreciated, and since there is no feature in the rejection where the two are equated functionally, Appellant's decree that the Examiner need furnish evidence to support such a notion is rendered moot.

In the Examiner's view, the difference in opinion lies in the rationale for combining references. Appellant's contend that no motivation exists for using Kline's compounds in syndiotactic 1,2-polybutadiene because they are poor antioxidants. Here, Appellants seem to take the position that motivation to apply teachings from one reference to another must be the same as their motivation for arriving at their own invention. Put another way, because the present invention uses dialkylaminomethyl phenols as antioxidants, Appellants imply that a rejection using Kline is proper if reference also shows that dialkylaminomethyl phenols were good antioxidants. However, it is well established that motivation in the prior art to combine references does not have to be identical to that of the applicant to establish obviousness.³

³ *In re Kemps* 97 F.3d 1427, 1430, 40 USPQ 1309 (Fed. Cir. 1996); *In re Lintner* 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

Appellant's line of reasoning does not dispel the obvious conclusion to use Kline's compounds in syndiotactic 1,2-polybutadiene, motivated by the fact that, as effective catalyst deactivators, they would stabilize the polymer against effects of oxidative degradation caused by metallic residue. Note also that in broadest terms, anti-oxidative (stabilizing) processes would be operative, albeit by different mechanisms.

That Kline's compounds, 2,6-di-*t*-butyl-4-dimethylaminomethylphenol and 2,6-di-*t*-butyl-4-piperidinomethylphenol, meet the structural requirements set forth in present claim 1 is irrefutable. The reader of the patent does not need to infer a seemingly unobvious embodiment from some generic skeletal structure. Rather, these particular compounds are recited specifically, and this renders their use especially obvious. Selection of these particular species is also obvious because the listing of compounds in column 2 of Kline is not a lengthy one.

Appellants point out that 2,6-di-*t*-butyl-4-dimethylaminomethyl phenol and 2,6-di-*t*-butyl-4-piperidinomethylphenol are not disclosed as preferred compounds for the invention of Kline. This does not show why it would not be obvious for the skilled artisan to use them as catalyst deactivators, for a reference must be considered in its entirety and not limited to preferred embodiments or specific working examples contained therein.⁴

In establishing a *prima facie* case of obviousness, a reasonable expectation of success must exist, and the prior art references when combined must teach or suggest all the claim limitations. First, a reasonable expectation of success is derived from the reasons to combine references (*vide supra*): the skilled artisan would expect Kline's compounds to be successful in

⁴ *In re Lamberti* 545 F.2d 747, 780, 192 USPQ 278, 280 (CCPA 1976).

preventing oxidative degradation in syndiotactic 1,2-polybutadiene by deactivating catalyst residue. Second, the present invention is drawn to a stabilized syndiotactic 1,2-polybutadiene composition comprising two components: (i) a syndiotactic 1,2-polybutadiene and (ii) a compound (antioxidant). Indeed, one may conclude that the embodiment of the combined references is a syndiotactic 1,2-polybutadiene composition comprising two components: (i) syndiotactic 1,2-polybutadiene (*as per* Luo) and (ii) essentially the same compound (*as per* Kline) that confers antioxidative effects, resulting in a “stabilized” composition. As such, all claim limitations are contained in the teachings of the prior art. They have not been culled from the Appellants specification.

In conclusion, it is maintained that a *prima facie* case of obviousness has been established properly.

(B) Applicants declare they have effectively rebutted any alleged *prima facie* case of obviousness with objective evidence of unexpected results.

The results of the experiments submitted in Appellant’s declaration under 37 C.F.R. 1.132 have been reviewed thoroughly. Whereas 2,4,6-*tris*(dimethylaminomethyl)phenol is ineffective in preventing crosslinking in syndiotactic 1,2-polybutadiene under one specific oxidizing condition (during compression at 210 °C), 2,6-di-*t*-butyl-4-dimethylaminomethyl phenol is effective in preventing crosslinking under identical conditions.

These data are insufficient to rebut a *prima facie* case of obviousness. If anything, the data would support the obviousness of selecting Kline’s 2,6-di-*t*-butyl-4-dimethylaminomethyl

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phenol as a stabilizing compound (or antioxidant or crosslinking retardant). Also, the rejection of record does not concern use of 2,4,6-*tris*(dimethylaminomethyl)phenol.

(C) Appellants have submitted a statement of independent basis of patentability of claims 2, 21, and 22, pointing out that these claims are patentably distinct over cited prior art.

Appellants are correct in noting that DAAMP is normally used in an amount of 1-5 mole per mole of transition metal catalyst. The polymerization examples tabulated in Luo are similar to that of Example 1 of the present invention. Therefore, Appellant's example is representative of the prior art. Appellants calculations are correct, and they show that for a majority of examples, Kline's prescribed amount of 1-5 mmole 2,6-di-*t*-butyl-4-dimethylaminomethyl phenol in the amount of recovered polybutadiene equates to a weight ratio that lies outside the claimed ratio of 0.1-10 parts by weight per 100 parts by weight of polymer (see present claim 2).

Example 17 of Luo shows a case where the polymer yield is only 21%, and this is equivalent to 15.8 g of polymer. For 0.075 mmole of catalyst, one may use 0.075 mmole of 2,6-di-*t*-butyl-4-dimethylaminomethyl phenol. This composition would contain 0.12 parts of 2,6-di-*t*-butyl-4-dimethylaminomethyl phenol per 100 parts of polymer, and such a composition would meet the limitation set forth in present claim 2. If one were to use 0.075 mmole of 2,6-di-*t*-butyl-4-piperidinomethylphenol instead, the composition would contain 0.14 parts by weight of compound to 100 parts of polymer. Therefore, the numerical range of 0.1-10 parts by weight, recited in present claim 2, remains obvious in view of the teachings of the prior art.

For the above reasons, it is believed that the rejections should be sustained.

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Appellants calculations provide cogent evidence that claims 21 and 22 are patentably distinct from the prior art. The prior art does not teach or fairly suggest a syndiotactic 1,2-polybutadiene composition in which the claimed compound(s) are present in an amount of 0.2-5 parts by weight per 100 parts of polymer. Therefore, the rejection of claim 21 is invalid and is thereby withdrawn. It follows that the rejection of claim 22, which recites a narrower range than that of claim 21, is also invalid. Therefore, the rejection has been withdrawn.

As indicated in paragraph 3 of this brief, claims 21 and 22 are objected to as being as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims

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Respectfully submitted,



Rip A. Lee
Examiner
Art Unit 1713

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November 25, 2003

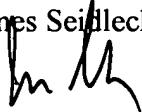
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